

## **Global warming induced changes in rainfall characteristics in IPCC AR5 models**

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### **Abstract**

Changes in rainfall characteristic induced by global warming are examined from outputs of IPCC AR5 models. Different scenarios of climate warming including a high emissions scenario (RCP 8.5), a medium mitigation scenario (RCP 4.5), and 1% per year CO<sub>2</sub> increase are compared to 20<sup>th</sup> century simulations (historical). Results show that even though the spatial distribution of monthly rainfall anomalies vary greatly among models, the ensemble mean from a sizable sample (about 10) of AR5 models show a robust signal attributable to GHG warming featuring a shift in the global rainfall probability distribution function (PDF) with significant increase (>100 %) in very heavy rain, reduction (10-20%) in moderate rain and increase in light to very light rains. Changes in extreme rainfall as a function of seasons and latitudes are also examined, and are similar to the non-seasonal stratified data, but with more specific spatial dependence. These results are consistent from TRMM and GPCP rainfall observations suggesting that extreme rainfall events are occurring more frequently with wet areas getting wetter and dry-area-getting drier in a GHG induced warmer climate.